EMERGENCY DISPATCH WORKSTATION

FIELD OF THE INVENTION

The present invention relates to workstations and, in particular, to an ergonomic workstation having more than one vertically adjustable work surface.

BACKGROUND OF THE INVENTION

Although desks and workstations in use today for office workers are predominantly conventionally designed furniture having a relatively large, flat, and fixed horizontal working surface, recent research into the health implications of a one-size-fits-all approach to such furniture has generated a certain amount of concern. Much of the progress in this area has been directed to the user's chair, basically allowing the user to adjust his or her position relative to the workstation to achieve a comfortable fit. More recently, ergonomically designed workstations have become available wherein the workstation itself is designed to provide a better fit to the user rather than requiring the user to accommodate to the workstation. Such ergonomic improvements have included, for example, angled work surfaces or forward portions of work surfaces that are designed to comfortably support the user's arms, height-adjustable work surfaces, foot supports, and the like. Such ergonomic improvements are all generally directed to increasing the user's comfort, particularly over longer periods of time, and to preventing injuries such as repetitive motion injuries.

In addition to the ergonomic comforts that may be achieved by appropriate design of the geometry of the workstation, it may also be desirable to have environmental accoutrements to improve a user's comfort. For example, users frequently place fans and/or heating units on or near the workstation to control the local temperature and air

flow. Users may also place lighting, particularly adjustable lighting, onto a workstation in order to control lighting about the workstation area.

Dispatch operators, such as emergency dispatch operators who answer "911" call lines have special needs. Frequently, for example, dispatch operator stations include a number of different display monitors, connected to one or more computer systems, that display different information, such as caller identification (ID) information, emergency services information, local map information, referral information, and the like. The dispatch operator may have one or more input devices, for example, to contemporaneously log information relating to an emergency call or to retrieve specific information to appropriately respond to a call. It is important that the display monitors be positionable at a desired height and that the input device be independently positionable at a desired height.

The dispatch operator often works in a very high-stress, time-critical, multitasking situation where minor delays or mistakes can have significant negative consequences. The dispatch operator may have to deal with multiple, concurrent calls and accurately assess the criticality of each call to appropriately prioritize the calls. It is therefore particularly important that the dispatch operator be able to provide full attention to the dispatcher's duties, without unnecessary external distractions or influences. Also, dispatch operators are generally highly-trained professionals, and it is desirable to provide an environment that is comfortable and healthful to reduce absenteeism and turnover.

In addition, because the duties of the dispatch operator typically require a significant amount of expensive equipment, the dispatch workstation may be used by many different dispatchers—for example, during different shifts and to provide coverage during breaks. It is therefore desirable that the dispatch workstation be flexible and adjustable to accommodate different users. In particular, workstation adjustment must be convenient and quickly achieved, so that the adjustment itself is less likely to become a distraction when calls come in. For example, a first dispatch operator may be more effective and prefer to work standing, whereas a second dispatch operator is more effective sitting. If they both use the same dispatch workstation (at different times) then the workstation must be sufficiently adjustable to accommodate users either standing or sitting. Similarly, a given operator may alternate between sitting and standing.

It should also be appreciated that emergency dispatch rooms frequently include a number of different workstations and more than one dispatcher at a time. The emergency nature of the calls and the inherent stress frequently result in the dispatch room taking on the ambiance of a war room, with generally little extraneous noise and low or subdued lighting levels that facilitate the dispatchers' reading of the various display devices. It is therefore common to have one or more individual lights at the workstations that can be positioned to not cause glare in the display devices, while providing the dispatcher with adequate lighting.

What is needed, therefore, is a workstation that is easily and quickly adjustable to accommodate different dispatchers and that also provides convenient and less distracting environmental controls.

SUMMARY OF THE INVENTION

A workstation is disclosed having a number of comfort-enhancing aspects that are particularly suited for use in emergency dispatch applications. The workstation has a height-adjustable back work surface that may support, for example, a plurality of monitors, and a separately height-adjustable front work surface that may support, among other things, a user input device, such as a keyboard. A movable work light and movable fan are also provided. A single point user interface having controls for adjusting the work surface heights and controlling the light and the fan is also provided. The single point user interface provides a simple, readily accessible control system whereby a user can achieve a desired level of comfort with minimal distraction.

In an embodiment of the invention, the back work surface is attached to a plurality of linear actuators for selectively adjusting the height of the work surface and wherein each actuator includes a servo motor and a pair of telescoping tubes.

In an embodiment of the invention, the front work surface is connected to the back work surface with a height-adjustment mechanism including a separate linear actuator, whereby the front work surface height is selectively adjustable relative to the height of the first work surface.

In an embodiment of the invention, a radiant heating unit, such as a heated floor pad, is also provided.

In an embodiment of the invention, a control box receives input signals from the single point user interface and generates corresponding output signals to the linear

actuators, lights, fans, and/or heater, to achieve the desired function. The control box may be conveniently mounted to an undersurface of the back work surface.

In an embodiment of the invention, an activity sensor is provided for detecting when a user is in proximity to the activity sensor, such that at least some of the powered devices of the workstation may be powered down when the workstation is not in use.

In an embodiment of the invention, a separate switch is conveniently mounted near the front of the workstation such that a user can move the work surfaces to a lower position—for example, to allow limited-mobility users to access the single point user interface.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing aspects and many of the attendant advantages of this invention will become more readily appreciated as the same become better understood by reference to the following detailed description, when taken in conjunction with the accompanying drawings, wherein:

FIGURE 1 is a perspective view of an embodiment of a dispatch operator workstation according to the present invention;

FIGURE 2A illustrates, in block diagram form, the control box for the workstation shown in FIGURE 1 and the devices connected to the control box;

FIGURE 2B is a fragmentary view of the underside of the workstation shown in FIGURE 1, showing a location installing the control box;

FIGURE 3 is a perspective view of the workstation of FIGURE 1, with some components removed for clarity, and exposing the lifting legs for adjusting the height of the back work surface, and the mechanism for adjusting the height of the forward work surface;

FIGURE 4 is a partial, cross-sectional side view of the workstation of FIGURE 1, showing the mechanism for adjusting the height of the forward work surface;

FIGURE 5A is a perspective view of the systems controller for the workstation of FIGURE 1;

FIGURE 5B shows a partially exploded view of the systems controller shown in FIGURE 5A;

FIGURE 6A is a perspective view of the single point user interface for the workstation shown in FIGURE 1;

FIGURE 6B is a partially exploded view of the single point user interface shown in FIGURE 6A;

FIGURE 7A is a perspective view of one of the fan units for the workstation shown in FIGURE 1; and

FIGURE 7B is a partially exploded view of the fan unit shown in FIGURE 7A.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

A particular embodiment of the present invention will now be described, with reference to the figures, wherein like numbers indicate like parts. FIGURE 1 shows a perspective view of a dispatch operator workstation 100 made in accordance with the present invention. The workstation 100 includes a vertically-adjustable back work surface 102 adjacent to a vertically-adjustable front work surface 104. The work surfaces 102, 104 are generally supported by left and right pedestal components 106, 108. The pedestal components 106, 108 may include, for example, equipment shelves, drawers, and/or other convenient storage areas, as are known in the art. The workstation 100 may be partially surrounded with a plurality of upright walls 110, which may be supported, at least in part, with a plurality of elongate upright members 112. The walls 110 may have a sound-deadening outer layer, such as a natural or synthetic fabric sheet material. As shown in FIGURE 1, the back work surface 102 may support one or more monitors 90 (four shown) or other dispatch equipment such as radios, computers, control panels, or the like. The forward work surface 104 may support one or more user input devices such as a keyboard(s) 92, mouse, microphone, or the like. Obviously, in addition to the system components that will be described below, the work surfaces 102, 104 will also, in general, support other devices such as telephones, reference materials, and the like.

As discussed in more detail below, the back work surface 102 is height-adjustable to accommodate the preferences of a particular user, and the front work surface 104 is also, and independently, height adjustable. The workstation 100 includes a first work light 114, and a second work light 116, although more or fewer work lights may alternatively be utilized. The work lights 114, 116 may be of different types to suit the desires of different users. For example, the first work light 114 may be a halogen-type work light, and the second work light 116 may be a fluorescent- or incandescent-type work light. A plurality of free-standing fans 118, preferably low voltage DC fans, are

movably disposed on one or both of the work surfaces 102, 104. A heating unit, such as a heated floor pad 120, is disposed below the workstation 100. The workstation 100 also includes a single point user interface 130 that includes a plurality of controls that permit the user to adjust the work surface 102, 104 height, and the operation of the lights 114, 116, fans 118, and heated floor pad 120, as discussed in more detail below. In the disclosed embodiment, an activity sensor 122, such as a motion detector, is also disposed near the front portion of the workstation 100 for detecting the proximity of a user, and a separate ADA switch 124 for moving the work surfaces 102, 104 up or down is also provided.

Refer now to FIGURES 2A and 2B. FIGURE 2A illustrates in block diagram form the interconnection of the active components of the workstation 100 into a central control box 150. The "black box," or control box 150, is mounted to the workstation 100, preferably to an underside of the back work surface 102 (see FIGURE 2B), such that the control box 150 is accessible to the user, but not intrusive or in the way of the user. The control box 150 is operatively connected to the single point user interface 130, lift mechanisms (discussed below) for the back and front work surfaces 102, 104, the first and second work lights 114, 116, the fans 118, the heated floor pad 120, and the activity sensor 122. The operative connection may be, for example, by cables or by other suitable systems including, for example, wireless connection systems, as are well known in the art. The control box 150 is adapted to receive input signals from the single point user interface 130, generally resulting from a user action on the controls of the single point user interface 130, and to generate output signals in response to the input signals, to control the operatively connected devices described above.

If an activity sensor 122 is utilized, the control box 150 will also monitor an input signal from the activity sensor 122 and generate an output signal after a predetermined period of inactivity—for example, to turn off the work lights 114, 116, fans 118, and/or heated floor pad 120 when the workstation 100 has been vacant. In a preferred embodiment, the activity sensor 122 continues to monitor to detect if a user approaches and re-energizes the work lights 114, 116, fans 118, and/or heated floor pad 120 at their previously-set levels when a person is detected within a predetermined proximity to the activity monitor 122. Also, the ADA switch 124 provides a readily accessible control for lowering the work surfaces 102, 104. The ADA switch provides a convenient mechanism

for a user with limited mobility to lower the work surfaces 102, 104 in order to gain access to the single point user interface 130. In a preferred embodiment, the ADA switch 124 may also be used to raise the work surfaces 102, 104 to their uppermost position. This has been found to be convenient, for example, when access to the underside of the workstation 100 is desired—for example, for maintaining the system or reconfiguring the control box 150.

FIGURE 3 shows the workstation 100 with much of the structure removed to expose the lifting leg assemblies 200. The lifting leg assemblies 200 utilize conventional linear actuators to raise and lower the back work surface 102 to a desired height. In the disclosed embodiment, four vertical lifting leg assemblies 200 are positioned to lift the back work surface 102. The lifting leg assemblies 200 include an outer tube portion 202 and a telescoping inner tube portion 204 that slidably engages the outer tube portion 202. The outer tube portion 204 is fixedly attached to the work station 100 with brackets 203. A motor 206 is disposed at the upper end of each inner tube portion 204 and attached to the underside of back work surface 102. The inner tube portion 204 engages a screw assembly (not shown), that is rotatably driven by the corresponding motor 206, thereby raising or lowering the inner tube portion 204 and the back work surface 102. Although an electric, screw-type, linear actuator is described, it will be readily apparent that any suitably controllable linear actuator mechanism may be used. Suitable linear actuators may be obtained, for example, from LINAK U.S. Incorporated in Louisville, Kentucky. It will be appreciated that more or fewer lifting leg assemblies may be used, without departing from the present invention—for example, to accommodate larger or smaller movable work surfaces. It will also be appreciated that the operation of the lifting leg assemblies 200 must be coordinated to maintain the generally horizontal orientation of the back work surface 102. In the present embodiment, the motors 206 are servomotors that output position and/or rotation information to a supplemental controller (not shown), such that the operation of the motors may be determined with suitable precision to achieve the desired coordination to keep the back work surface 102 horizontal. It is contemplated that stepper motors might alternatively be used, or feedback from independent electronic levels might alternatively be used, to achieve the desired coordination between the lifting leg assemblies 200.

The lift mechanism 210 for the front work surface 104 can also be seen in FIGURE 3, and more clearly in the cross-sectional side view of FIGURE 4. FIGURE 4 shows a cross-sectional side view of the work station with some structure removed for clarity, and illustrates the lift mechanism 210 for adjusting the height of the front work surface 104 relative to the back work surface 102. The lift mechanism 210 attaches with first brackets 211 to the underside of the back work surface 102, and with second brackets 213 to the underside of the front work surface 104. Left and right pivotable lever mechanisms 214 are disposed therebetween, configured to allow the front work surface 104 to move vertically, while maintaining a substantially horizontal orientation. A shaft 218 interconnects the left and right pivotable lever mechanisms 214 (see FIGURE 3), such that the lever mechanisms 214 pivot together. A linear actuator 216 is drivably connected to the shaft 218, and is operable to rotate the shaft 218 such that the front work surface 104 may be selectively moved upwardly or downwardly. The linear actuator 216 may be of any suitable type as is well known in the art, and may be purchased, for example, from LINAK U.S. Incorporated, of Louisville, Kentucky. In the disclosed embodiment, the front work surface 104 may be moved between a position vertically lower that the back work surface 102, to a position above the back work surface 102.

Refer now to FIGURES 5A and 5B, which show an embodiment of the control box 150. The control box 150 is a relatively low profile component, having a box portion 151 and an upper panel 152 attachable to the box portion 151—for example, with a plurality of machine screws 153. The upper panel 152 includes a plurality of attachment apertures 154 for attaching the control box 150 to the underside of the back work surface 102—for example, with screws or bolts (not shown). It will be readily appreciated that the control box 150 may be alternatively installed on the work station 100—for example, by placement on a shelf, bracket assembly, bonding, or the like—without departing from the present invention. The control box 150 includes a front panel 155 supporting a plurality of various sockets for interfacing with the components discussed above. A power socket 156 is adapted to receive a power cord (not shown) for providing power to the control box 150. A power switch 158 may be provided to allow the user to turn off the control box 150. A plurality of controlled power sockets 160 (five shown) is provided and adapted to selectively provide power to the heated floor pad 120

and the work lights 114, 116. It will be appreciated that the work lights 114, 116 may be dimmable (for example, a halogen-type light) or simply switchable (for example, a fluorescent-type light), and different sockets may be desired, depending upon the type of light.

The control box 150 also includes a plurality of low voltage DC fan sockets 170 (three shown), two or more work surface actuator sockets 172 (three shown), a first input socket 174 for connecting the single point user interface 130, and a second input socket 176 for connecting the activity sensor 122. An ADA switch socket 178 is also provided that receives input from the ADA switch 124, such that a user can conveniently lower the work surfaces 102, 104—for example, to gain access to the single point user interface 130. Modifications of the present embodiment will be readily apparent to persons of skill in the art if alternative connection systems, such as wireless connections, are utilized rather than cables.

The control box 150 receives input signals from the single point user interface 130 and from the activity sensor 122, and uses those input signals to generate control signals and/or to control the power supplied to the various devices connected to the control box 150. It will now be appreciated that this configuration allows the user to adjust the work surface height, the lighting, the heating, and the fans, from the single point user interface 130, with very little effort.

An embodiment of the single point user interface 130 is shown in FIGURES 6A and 6B. The user interface 130 may be approximately the size of a conventional computer mouse, and includes control input elements for the components described above. In this embodiment, a push button control 135 is provided for turning on or off the work lights 114, 116, fans 118, and heated floor pad 120 with a single action. This may be useful, for example, if a particular workstation is to be left unused for a long period of time, e.g., overnight. First and second rotary switches 131, 132 are provided for controlling the first and second work lights 114, 116. The rotary switches 131, 132 switch the work lights 114, 116 on and off and/or adjust the brightness level of the work lights 114, 116 if the controlled light is dimmable. It will be appreciated that in some embodiments, the rotary switches 131 and/or 132 may control more than one work light. A third rotary switch 133 controls the speed of the fan(s) 118. In the current embodiment, up to three fans 118 may be incorporated into the system. A fourth rotary

switch 134 controls the heated floor pad 120, allowing the user to adjust the temperature of the heated floor pad 120.

A first rocker switch 136 is provided for moving the back work surface 102 either up or down, depending on which direction the first rocker switch 136 is depressed. In this embodiment, a digital display 137 is provided that displays a number corresponding to the current height of the back work surface 102, such that a user can easily and repeatably achieve a preferred height. A second rocker switch 138 is similarly provided for moving the front work surface 104 up or down. A second digital display 139 is also provided to indicate the relative height of the front work surface 104. As seen in FIGURE 6B, the single point user interface 130 includes a base 140 having side walls 141, a printed circuit board 142 containing the switches and associate circuitry, a top cover 144 that attaches to the base 140 to generally enclose the printed circuit board 142, and a face plate 145 bearing appropriate markings (not shown) identifying the controls. A cable 146 attaches the single point user interface 130 to the control box 150, as discussed above. Four non-skid feet 147 are affixed to the bottom of the base 140.

As shown in FIGURES 7A and 7B, the fan 118 of the disclosed embodiment is a free-standing unit having left and right inlet grills 180 and a front end outlet louver 182. A squirrel-cage type fan and motor assembly 188 is drivably disposed in a two-piece housing 187. The fan 118 is preferably a low-voltage DC fan, so as to avoid interference with any other electronic equipment on the workstation 100. A supporting base 184 includes an upright stanchion 185 for pivotable attachment to the fan 118, such that the outlet louver 182 of the fan 118 may be directed in a range of positions in a vertical plane. The cable 186 is preferably long enough to allow the user to place the fans 118 in a convenient orientation and position on the workstation 100. An optional filter 181 may be provided at the air inlet, which may be attached by any convenient method—for example, with adhesive strips 183. Four non-skid feet 189 are affixed to the bottom of the base 184.

While the preferred embodiment of the invention has been illustrated and described, it will be readily appreciated that various changes can be made therein without departing from the spirit and scope of the invention. For example, it is contemplated that the back work surface 102 may comprise a plurality of separate portions, and that only a single portion, or less than all of the portions, may be height adjustable. It is also

contemplated that the workstation may include more than two independently adjustable work surfaces.